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dages of the genus *Atrypa*, by R. P. Whitfield. Professor Hall's contributions to Palæontology include a compendious extract from his work on the Graptolites (Decade ii, of the Canadian Geological Survey), extracts from Vol. 4 of the Palæontology of New York, and observations on the Niagara limestone of Wisconsin and Illinois. The extracts are principally notices of the generic characteristics of the Devonian genera, filled with facts of the greatest value to the student of this group, and the observations trace the relation of the Niagara group, of New York, to the Guelph limestone of Canada, and the limestones of Racine and Le Claire in Wisconsin, which are said to be identical with a thin bed of limestone in Wayne county, New York, formerly referred to the Onondaga Salt Group. The lithographer has not, apparently, done full justice to Mr. Whitfield's masterly drawings, but all the plates are good, and some deserve high praise.

NATURAL HISTORY MISCELLANY.

BOTANY.

VARIATION IN WILD PLANTS.—Cultivation gets more credit for producing variation in species than I think it is fairly entitled to. The production of double flowers is especially referred to the gardener's art. I think this is rarely the case. Double Buttercups (*Ranunculus acris*, *R. bulbosa*, and *R. ficaria* all have double forms) could scarcely result from cultivation, as they are too common to be ever a cultivated plant. Yet we rarely see any tendency in this direction in wild plants. The only one I ever found double was a *Saxifraga Virginiensis*, in a shady wood on the Wissaniccon, some fifteen years ago. It was transplanted to my garden, but destroyed the same season by a careless laborer. Has any other double flower been found?—T. MEEHAN.

Saxifraga Virginiensis was found full-double at Danvers, Mass., three years ago, and it continues so from year to year. It is well worthy of the florist's attention. Incipient doubling is not uncommon in a considerable number of wild flowers; but the process of doubling is doubtless accelerated under the conditions which attend cultivation.—A. GRAY.

ZOOLOGY.

THE McNIEL EXPEDITION TO CENTRAL AMERICA.—In May last, Mr. J. A. McNiel, an enthusiastic and ardent naturalist and indefatigable collector, started on his expedition, under the immediate auspices and direction of the Peabody Academy of Science. Arriving at Panama he was cordially received, and aided by the officers of the Panama Railroad and

Pacific Steamship Company, who gave him much desirable information, and helped him in his work in every way in their power. To William Nelson, Esq., Commercial Agent at Panama, he is much indebted for assistance received; and from Captain Dow (who is well known as an ardent lover of Natural History, and who has sent many rarities to various museums) he received marked attention and kindly aid; and Captain Douglass of the steamer Guatemala, and his officers, were most courteous to him during his trip from Panama to the port of Coriuto (formerly Realejo), Nicaragua, at which place he made his first collections. He here had the good fortune to meet with Captain Emmons, of the U. S. sloop of war Ossipee, who, with his officers, kindly assisted him in his marine collecting. After a stay of a few weeks at this place, Mr. McNiell went into the interior and collected for about a month on and near the Rio Gigillillo, where he was most hospitably entertained by Don Ycido Ycaza. He here collected a large number of insects, comprising about 3,000 butterflies, which were packed in papers, and large quantities of other orders in alcohol; together with about 1,500 unios, and about a bushel of various species of land and fresh-water gasteropods, with many other species of various classes. He then returned to the coast to forward his specimens to the Academy, where they have arrived in safety. At the date of his last letter he was on the eve of departure for the interior again.

We take great pleasure in making this public acknowledgment of the uniform assistance and courtesy extended to Mr. McNiell by the various gentlemen whom he met, as it is most gratifying to the naturalist to feel that he is every day meeting more and more with the sympathy and encouragement of educated men, and that the dark days of science, when a naturalist was looked upon as a person a little out of his proper mind who spent his time "Bug-hunting," is now buried in the past, and that henceforth a man can run after a butterfly, or bespatter himself with mud, in his attempts to obtain some desired inhabitant of the ditch, without feeling that he is looked upon by his fellow-men as a "natural" instead of a naturalist.

It is the intention of Mr. McNiell to spend about two years collecting in Central and the northern part of South America, and from the way in which he has commenced, we feel sure that science will be largely indebted to him for much that is new and important from that most interesting region.

As there are no funds of the Academy that can be devoted to such an expedition, we shall have to depend upon the liberality of the friends of science, and the sale of part of the specimens for its maintenance. On the receipt of specimens at the Academy they will be at once arranged, and after selecting a series for the "McNiell Collection" of the Academy, the rest will be offered for sale, and special investigators can secure the specimens relating to their departments, by addressing the Director of the Academy. Donations in aid of the expedition are also solicited. Any party aiding the expedition will receive an equivalent in specimens if

desired, as well as the thanks of the Academy. We shall from time to time call attention in the *NATURALIST* to the progress and results of this expedition.—F. W. PUTNAM, *Director, Peabody Academy of Science.*

THE SHELLS OF MONTANA. *Helix Townsendiana* Lea.—Numerous small specimens were found in the dry prairie at the junction of Hell Gate and Bitterroot rivers, and as I found larger ones of various sizes in more damp situations of the woods, from an elevation of 4,800 feet down to 2,200, at the west base of the Bitterroot range, I presume this is a dwarfed variety, such as is found also west of the Coast Mountains, in Washington Territory. It is the most wide-spread species I have seen there.

Triodopsis Mullani Bland & Cpr.—A single dead specimen, of a beautiful semitransparent yellow, resembling *H. tridentata* in size and form, I found here under a stone, and afterwards found in small numbers at the west side of the Bitterroot crossing, forty miles distant.

Helicodiscus? polygyrella Bld. & Cpr.—This beautiful little one-toothed species I found common on the Cœur d'Aléne Mountains, especially their east slope, inhabiting moss and decaying wood in the dampest part of the spruce forests.

Anguispira Cooperi W. J. B.—This fine species I found only on the east slope of the dividing ridge of the Rocky Mountains, at an elevation between 5,500 and 6,000 feet above the sea! From the dryness of the season (Aug. 10) I presume I could find none moving about, and but one alive. Most of them were about the roots of *Geranium incisum*, a species abundant on both slopes, but I looked for Helices in vain in the other.

Anguispira solitaria Say (or *A. Cooperi* var?).—The large globose lipless *Helix* inhabited both slopes of the Cœur d'Aléne Mountains, above 2,500 feet elevation, preferring the openings in the forest covered with bushes and ferns.

Anguispira strigosa Gould.—I was always on the lookout for Helices, and up to August 31st found none along the Bitterroot river except rarely *H. Townsendiana*. That day, however, at a hill called "Half-way," thirty miles below the junction, I found two additions to the list. The larger, flattened, banded and somewhat carinated form, I found *estivating* under logs of pine on a steep shaly slope containing lime in veins.

Hyalina arborea Say; *Patula striatella* Anth.—Found in damp bottom land along Hell Gate river, about 4,800 feet above the sea, living on decayed logs, etc. Not seen elsewhere.

Lymnæa palustris Linn.; *L. bulimoides* Lea.; *L. desidiosa* Say; *Physa heterostrophæ* Say.—Missouri river above the falls, about 3,000 feet above the sea. August, 1860.

Lymnæa palustris Linn.; *L. humilis* Say; *Bulinus hypnorum* Linn.; *Physa heterostrophæ* Linn.—Hell Gate river, west slope of the Rocky Mountains, 4,800 feet above the sea. August 14, 1860.

Planorbis trivolvis Say; *P. parvus* Say.—Bitterroot river.

Sphærium striatinum Linn.; *Unio luteolus* Lamk.; *Margaritana arcuata* Gould.—Missouri river above the falls. Also found in Spokane river, below

Lake Cœur d'Aleñe, and at the ferry over that river. They can be seen in the clear water several feet beneath, completely covering the bottom like mussels (*Mytili*) on shoals along the seashore, standing edgewise among the large stones.

Sphaerium occidentale Prime.—Spokane river, September 1860.

Unio Oregonensis Lea?—I saw a few valves in Spokau river, below the upper falls.

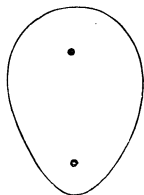
Ancylus Kootaniensis Baird.—Spokane river, below lower falls, on stones, September, 1860; common.—J. G. COOPER, M. D.

HINTS ON OÖLOGY.—In every branch of natural history, collections must be formed and suitably classified to enable the student to compare one specimen with another, and thus secure to science the benefit arising from his speculations. The mere collecting of specimens, it is true, has become one of the least of the objects desired by scientific men, yet in no branch of scientific pursuit is there more need of care and accuracy, than in the collection and identification of specimens of natural history. And especially is this true in an oölogical collection, where the identification of each specimen ought to be the main object of the collector.

The easiest and most satisfactory method of identifying a nest of eggs, is by shooting or catching one or both the parent birds to which the nest belongs, but at times this is impossible and other means must be sought. Examine carefully the situation of the nest, of what materials it is composed; notice the locality, what species frequent it, and make a record of these and kindred observations in a note-book. In this manner the true species may often be discovered. The proper method of preserving eggs next invites our attention. Eggs must be emptied of their contents, as they are liable to swell and burst the shell if handled.

The most convenient way of effecting this, is to drill two small holes on the side (Fig.1), and not at each end, as is the more common method. Having done this, apply the mouth or a small blowpipe at the smaller hole, forcing the contents out of the larger. If it contains an embryo, force out as much as possible without breaking the shell, and, with a small glass syringe, partly fill the shell with water and make another attempt. If this is impossible, carefully enlarge the hole, and by means of a sharp penknife and small wire hook, the largest embryo may be successfully removed. The ingenuity of the operator will easily provide means for special difficulties, but in no case should an egg be left partly emptied, as it will immediately attract insects and ruin the specimen. The only instrument absolutely required are small drills and a syringe, though, when convenient, the use of blowpipes and elongated scapels will be very useful. It is considered a good plan to hold the egg over a basin of water when blowing it, that it may not be injured if it slips from the fingers. Some oölogists preserve the nest of the bird with the eggs, and, when practicable, the parent bird. Eggs should be carefully marked when laid aside, that no mistakes may

Fig. 1.



arise. Different collectors prefer different methods of doing this. Perhaps the best is to mark the egg, on the same side as the holes, with a quill pen. This should be done in neat letters, the name of the species, and the number, referring to the collector's note-book, which should contain full data in respect to the identification, time and place where secured, etc. Both the English and scientific name should be given. Many persons use very fine sawdust to lay their egg on, but this has a tendency to destroy the shells and ruin the specimens. Cotton is very good and is also employed by many. Eggs, when mounted on strips of cardboard, may be preserved in a neat and secure manner. They should be kept beneath a glass-case, free from the rays of the sun, which cause the natural tint or "bloom" to fade and lose its freshness. The student of nature cannot find a more interesting branch of scientific investigation, than that which pertains to those objects which are presented to his vision from day to day. The habits of the birds of North America, and their manner of building their nests and rearing their young, affords an opportunity of careful and minute study. The song-birds of New England are not the least of its many attractions, and the student who will make himself more conversant with their oddities, will find a world of beauty opening before his astonished gaze.—G. R. METCALF.

THE "DWARF THRUSH" AGAIN.—In the NATURALIST, for June of this year, Mr. E. A. Samuels gives a notice of the "Dwarf Thrush (*Turdus nanus*) in Massachusetts," the specimen referred to being taken in Waltham, by Mr. L. L. Thaxter. In the September number Mr. T. Martin Trippe mentions that he has obtained a bird of the same species (*T. nanus*) near Orange, N. J. The specimen described by Mr. Samuels being brought to me for identification, I had an opportunity of examining it several months before Mr. Samuels's notice of it appeared in the NATURALIST, and I unhesitatingly pronounced it a young bird (probably of the first year) of *Turdus Swainsonii*, it differing from average specimens of this species only in its rather unusually small size, and in certain well-marked characters of immaturity. After Mr. Samuels's account of it appeared, fearing I might have been mistaken, I sent to Mr. Thaxter for the specimen, and through his kindness was enabled to give it a re-examination. The result was the entire confirmation of my previous conclusion. Mr. Samuels, it will be observed, only compares it with *T. Pallasii*, from which in every way, it is clearly distinct, as he supposed; and hence, from its small size, he hastily concludes it must be the *T. nanus*, which I am sure he would not have done had he also compared it with *T. Swainsonii*. The specimen mentioned by Mr. Trippe, according to his description of it, does not appear to differ much from frequent specimens of *T. Pallasii*, though considerably, as he observes, from the description Mr. Samuels gives of his. As to *T. nanus*, if it be a distinct species, the specimen described by Mr. Trippe might perhaps be referred to it, though *T. nanus* has been supposed to be a western species, representing on the Pacific slope the *T. Pallasii* of the Atlantic. In a paper (now in press) in

the Memoirs of the Boston Society of Natural History, in which we give, incidentally, a review of this group of our Thrushes (sub-genus *Hylocichla* Baird, Review Am. Birds, 1864, p. 12), we attempt to show that it is not a species distinct from *T. Pallasii*, and that specimens entirely referable to it are of occasional occurrence in the Eastern States. *T. Audubonii* is also referred to *T. Pallasii*, *T. ustulatus* to *T. fuscescens*, and *T. Allicie* to *T. Swainsonii*. For a more detailed notice of Mr. Samuels's specimen, and a discussion of the nature and relations of these supposed species, the reader is referred to the paper above cited (Mem. Bost. Soc. Nat. Hist., Vol. I, p. 508, *et. seq.*).

Respecting the "bluish purple tinge" presented by the tail feathers of both Mr. Trippe's and Mr. Samuels's specimens, it is a character of no uncommon occurrence in all the Thrushes, as well as in the Fox-colored Sparrow (*Passerella iliaca*), the Song and other Sparrows and birds possessing a rufous tail, especially in young birds and in those that have recently moulted, not being a specific character at all, but generally a mark of fresh plumage.—J. A. ALLEN, *Cambridge*.

THE BARN OWL IN PENNSYLVANIA.—During the last year we have captured the "Barn Owl" (*Strix pratincola* Baird) in a high church steeple in this city (Lancaster), which is almost as rare a bird in this latitude as the Golden-eagle, although I am informed that it is more common in Maryland and Virginia. I visited their nesting place and obtained some of their voided pellets, four eggs, and two of their young,—the one just before its exclusion from the egg, and the other when it was six weeks old. So rapid is the development of this bird, that in six weeks it had increased, from less than a half ounce in weight to more than a pound, and in volume, to near the size of the adult. When it was prepared and mounted, the pin-feathers were just appearing in the wings and tail; otherwise, it looks like a mass of white cotton wool, or down, with formidable feet, beak, and eyes "stuck in," after the manner of making toys. Although I visited this "owllery" on several occasions, I never found the adults "at home," and the eggs were always exposed and quite cold. The young were excluded about the 27th of September. The pellets were composed of the bones and hair of mice and moles.—S. S. RATHVON, *Lancaster, Pa.*

WILSON'S SNIPE.—In reply to a note contained in the Natural History Miscellany, stating that W. A. Pope "has observed the *Scolipax Wilsonii* sitting on the top of a tree, at least thirty feet from the ground," and asking "if other ornithologists have observed this peculiarity," we would state that we once flushed a snipe which flew from the ground and immediately perched on the dry limb of a tree about twenty feet high, from which we shot the bird, induced by its extraordinary position, although contrary to our principles and practice as a sportsman. An old hunter, present on the occasion, averred that he had witnessed more than once a similar departure from the ordinary habits of the snipe.—J. M. H., *Kalamazoo*.

CARBOLIC ACID FOR PRESERVING INSECTS, ETC.—During the present summer I have used as a preservative fluid, an alcoholic solution of carbolic acid,—about four grains to the ounce. After killing the insect with chloroform, which I prefer, I thoroughly paint it with this preservative fluid and then dry it in the sun. During the past two months I have had a number of insects thus prepared, mostly Lepidoptera, pinned to the wood-work in my office, thus freely exposed during a season which has been very favorable for their destruction, and they now look as fresh and beautiful as on the day they yielded themselves as martyrs to the cause of science. I am well pleased with the action of carbolic acid, and feel satisfied that it is a sure protection and preservation. In stuffing animals, I use cotton soaked in this same alcoholic solution. Neither do I think it necessary to skin them as formerly, but simply remove the contents of the thorax and abdomen. Specimens prepared thus, a month ago, are now in good condition.—S. B. P. KNOX, M. D., *Brownsville, Pa.*

ALBINO ROBIN.—On the 19th of September, 1868, I shot at Marshall, Michigan, and preserved a specimen of *Turdus migratorius*, which is nearly white. The wing quills and tail are a creamy or soiled white. The upper parts darker, inclining to ash, and the breast and under parts lemon color, with the tips of the feathers white. Bill and feet bright yellow; eyes black. The general appearance of the bird when flying was white. Throat pure white.—D. DARWIN HUGHES.

KINGFISHER'S NEST AGAIN.—I examined two in Ohio; the entrance to the first was on the west side of a bank, some twenty inches from the surface, the tube did not curve, but was so straight that I could plainly see the nest, which was about twenty-eight inches from the mouth of the tube. The second was fully four feet deep, but straight as the other. I did not then notice the substance of the nest. The nests were somewhat higher than the mouths. Both contained young, the first seven and the second four.—P. G. MARCH, *New York.*

THE COW-BUNTING.—It would, perhaps, be interesting to know how many of our birds the Cow-bunting chooses as foster parents to her young. During the present season I have known the eggs of this bird to be found in nests of the *Sayornis fuscus* (Common Pewee), *Empidonax Acadicus* (Green-crested Flycatcher), and *Icteria viridis* (Yellow-breasted Chat), three species which I never knew to be imposed upon before. It is rather unusual for the Cow-bird to choose nests of the true Flycatchers, in which to deposit its eggs, these birds frequently deserting on very slight provocation.

I once found a nest of the *Pyranga rubra* (Scarlet Tanager), with the female sitting upon two eggs of the Cow-bird. On returning to the spot a few days after, for the purpose of obtaining the eggs of the owner, I was greatly surprised to find two young Cow-buntings in a flourishing condition, but no sign of a Tanager's egg. This was to me quite a new phase in the domestic affairs of birds,—one species building the nest while another furnished the eggs.—T. H. JACKSON, *West Chester, Pa.*

MIGRATION OF ANTS. — On the 17th of June, 1866, I noticed that the ants around my door were unusually numerous and active. They were not running about at random as if hunting for food, but kept in a path a few inches wide, which extended from the door into a neighboring yard. Some of the ants appeared to have unusually large heads, but on closer examination it appeared that each carried another ant in her jaws. If a pair of these were separated they ran about as if dizzy, rubbing their antennæ with those of every ant they met. When they had recognized each other by this means of communication, they clasped their jaws together, and raised their heads as high as possible from the ground. The ant, who was to be carried, then curved her body under the head of the other, and drew her feet close to it, so as to hang entirely free from the earth. In this position they were carried with very little difficulty, being entirely out of the way of the limbs of their carriers. Tracing the line of march I found it extended to the door-step of a neighbor, some twenty yards off, passing under a gate and over a step four inches high, and through several yards of ground covered with weeds and ashes. Every ant which left our neighbor's door carried another ant before it, with which it passed all these obstructions, and deposited it safely in the holes at the other end of the route. The ants, travelling in the opposite direction, were all empty handed. This transportation continued for ten days, excepting during a rain. The larvæ and pupæ were carried last. After the migration was finished, the ants settled down to their regular summer work, and appeared only in small numbers in search of food.

In a shady corner under the door-step, the ants brought out the remains of the insects, whose juices they had eaten, and left them in a little heap, from which I took at one time three or four teaspoonfuls of skins and legs, some of them belonging to beetles as large as twenty ants. — J. H. EMERTON.

[Mr. E. Norton informs us that this is the *Formica fusca* Linn. — Eds.]

IS THE CROW A BIRD OF PREY? — In the summer of 1866, while out on a collecting trip with my friends, Messrs. Gill and Smith, about a mile from this city, we saw a crow (*Corvus Americanus* of Audubon) pounce down into a barnyard, after the manner of a hawk, on a brood of young chickens and carry one of them off. The act seemed strange to us at the time, for although we knew that a great part of this bird's food, at this season, consisted of the eggs and young of small birds, yet we had never heard of its capturing its prey in this manner. Can any of our ornithologists tell me whether this is a common practice with this bird or not? — CHAS. H. NAUMAN, Lancaster, Pa.

ALBINISM IN BIRDS. — You can add to the list of Albino birds (page 161), a Reed-bird, shot near Philadelphia; the entire plumage is white, the bill and feet pale flesh-color. Also, a Robin; this is an instance of partial albinism, similar to that of the Blue Yellow-backed Warbler, described by Dr. E. Coues; that is, "the entire plumage is checkered or patched over with white, the normal colors showing in the spaces be-

tween the white." These specimens are in the possession of Joseph W. Drexel, Esq., of Philadelphia, who also has an example of a Ground Squirrel, or Fence-mouse, as it is commonly called, which is, with the exception of the stripes on the back, entirely white; the stripes are pale brownish or yellowish.

I trapped a snow-white specimen of the common rat, and also obtained another one from my friend, Mr. Charles Wood, of Philadelphia, but these, I suppose, are not uncommon.—HERMAN STRECKER.

MIGRATIONS OF BIRDS.—Do our migrating birds ordinarily follow the same route in their annual migrations? I think they do, uniformly, unless thrown out of their course by great stress of weather. In the fall of 1863, one morning I noticed a large flock of robins (*Turdus migratorius*) in my door yard, bathing in a kind of aquarium that I had constructed by excavating the earth and lining it with hydraulic cement. This tank is filled with water and swamp muck at the bottom, in which are growing the white Pond-lily (*Nymphaea odorata*), the leaves of which make a charming place for the birds to bathe and drink. Among the robins I noticed a fine Albino. He, with his *compagnons de voyage*, remained in my yard about half an hour, bathing, drinking, and eating the berries of the mountain-ash.

April came, and one morning my wife exclaimed, "Oh! what a large flock of robins!" I replied, "Look for my Albino," when my ears were greeted with "Yes, here he is, the same bird." He had some markings by which we knew him, two brown quills in his tail, and a few light-brown feathers on each shoulder. As before, they staid with me about half an hour, and passed on. Being sick, I had no expectation of living until fall, and requested my wife to watch for him the next autumn. How often I thought of that bird! shall I live to see him again? will he be alive? I knew he was a mark for the fowler and the naturalist. Fall came, and with it my Albino with a host of companions; they lingered as before, and passed on to the south. I had the same reflections about him and myself as before, made the same request to my wife to watch for him, and if he came again, and I was gone, to report to Professor Kirtland. Fall came, and with it my dear little Albino. Thus for five successive seasons this Albino came and went. Does not this pretty clearly settle the question? Whether he ever came again I do not know, for I sold my place and never heard of him again.—T. GARLICK, *Cleveland, O.*

THE UNICORN OF FABLE.—Mr. Groom-Napier observes that the discovery of the bones of a mammoth (1663) was the foundation of the fossil unicorn of Liebnitz, which the entire skeleton found in Siberia rendered a palpable error. The older naturalists were exceedingly fond of the subject of the unicorn, and the modern have made great efforts to identify the unicorn of the vulgate, which it is almost needless to say, points to an ideal animal, and not to the *rižm*, a two-horned animal, translated unicorn in the Old Testament, and now generally considered to be the *Bos urus*, or wild bull of Palestine, now extinct.—*Land and Water.*

SIREDON, A LARVAL SALAMANDER.—At the last meeting of the Boston Society of Natural History (Sept. 16th), Professor O. C. Marsh, of Yale College, gave an account of some observations which he had recently made on the metamorphosis of *Siredon* into *Amblystoma*, two genera of tailed Batrachians, usually placed in distinct families. During an excursion to the Rocky Mountains in August last, Professor Marsh obtained in Lake Como, a small brackish sheet of water in Wyoming Territory, several specimens of *Siredon lichenoides* Baird, known in that region as the "fish with legs." On bringing them to New Haven, one of them soon showed indications of a change similar to that observed by Duméril, in the second generation of Mexican Axolotls, kept in the Museum of Natural History, in Paris.

The first phase noticed in the transformation, was the appearance of dark spots on the sides of the tail, and soon after the membrane along the back, and especially that below the tail, began to disappear. Next the external branchiæ, or gills, began to be absorbed, and the animal came more frequently to the surface of the water for air. As the change went on, the spots gradually extended over the rest of the body; the membrane of the back and tail entirely disappeared; the external branchiæ, as well as their interior arches, became absorbed, and the openings on the neck closed up. The body also diminished in size, the head changed in form, becoming more rounded above and more oval in outline, and the eyes became more convex and prominent. The opening of the mouth and the tongue both increased considerably in size, the teeth changed in position, and the animal made frequent attempts to leave the water, and at last escaped as a true *Amblystoma*, apparently identical with *A. mavortium* Baird. Subsequently several other specimens underwent the same metamorphosis, during which various experiments showed that the rapidity of the change was greatly affected by variations in light and temperature; the specimens most favored in these respects having passed through the entire transformation in about three weeks. Whether the species ever changes in Lake Como, which is about 7,000 feet above the sea, is uncertain, but that it breeds in the Siredon state, like the Axolotls from the table lands of Mexico, there can be little doubt. This interesting metamorphosis renders it extremely probable, that all Siredons are merely larval Salamanders; and it also suggests a doubt whether some, at least, of the other so-called Perennibranchiates may not be the undeveloped young of well-known species.

THE YELLOW-HEADED BLACKBIRD (*Xanthocephalus icterocephalus* Baird).—We call this the Orange-head, knowing of no name more suitable. They arrive about the first of May, and disappear about the tenth of June. I do not think they breed in this country. They made themselves valuable to the farmers last spring in devouring the swarms of young grasshoppers. I had a lot of land on which the grasshoppers deposited their eggs by the million; as they began to hatch the yellow-heads found them out, and a flock of about two hundred attended about two acres daily, roving over

the entire lot as wild pigeons feed, the rear ones flying to the front as the insects were devoured. The farmers of Kansas are under great obligations to the little yellow-heads, or, as some call them, copperheads, for their services last summer.—W. J. McLAUGHLIN, *Centralia, Kansas*.

[According to Professor Baird, this bird is essentially a prairie bird, and is generally distributed throughout Western America, from Texas, Illinois, Wisconsin, and North Red River, to California, south into Mexico, and it has also been found in Greenland.—Eds.]

HABITS OF THE COMMON RED FOX.—While among the White Mountains in Stowe, Maine, a hunter told us that the fox comes out of its hiding-place at sunset to catch grasshoppers. At this time, and also at early dawn, they are hunted with the gun. In the winter the fox has been observed leaping vigorously upon the crust of the snow. The farmers say they do so to scare the field-mice out of their retreats beneath, in order to seize them.—Eds.

THE LOBSTER.—It is now almost universally admitted, that, in order to meet the yearly increasing demand, not alone for oysters, but also for lobsters, crabs, etc., some other means of reproduction must be pursued besides leaving them simply to nature to “increase and multiply.” This has been so well understood by the pisciculturists in France, that every exertion has been made to resuscitate the fisheries by increasing the produce by “artificial breeding.” Many oyster-beds that, a few years since, owing to the “greed” both of the oyster-dredger and the consumer, were completely denuded of oysters, are now in a flourishing condition; and the artificial cultivation, not alone of oysters, but of lobsters, crabs, and other food-fishes (thanks to the genius of M. Coste, Hyacinthe Bœuf, M. le Docteur Sauvè, and other celebrated pisciculturists), has turned out a complete commercial success. The French Government also, alive to the welfare of the fisheries of the coast, has encouraged in every possible manner the maritime industry of the seaboard, and has given concessions of portions of the foreshore to men belonging to the naval reserve, in order to have them artificially cultivated for the production of oysters, lobsters, and other fish. These grants have been availed of to a large extent by the sailors in different parts of France, and have been a source of great profit to them. The Imperial Government has also caused several establishments to be constructed, such as those at “Concarneau,” where lobsters and other crustacea are kept in tanks specially made for them, for the purpose of artificial propagation and rearing, whilst in other tanks, sea-fish, fit for food, are kept, so that the pisciculturist is enabled to study the habits of these various fishes, as well as their natural history. Were it possible to induce our Government to introduce similar establishments in this country, we should not now be bewailing the ignorance so much complained of at our recent sea-coast fishery enquiries in the House of Commons, when nearly all the witnesses had to confess they were completely ignorant of the habits, places of spawning, etc., of nearly all the varieties of fish frequenting our shores.

Monsieur Coste, in one of his writings, says: "It would be a great error to believe it were possible to attempt the education of any description of animal whatever, without knowing, at least in a superficial manner, something of its organization." We therefore purpose giving a short account of the natural history of the lobster, trusting to find the example set by the French Government at Concarneau, and followed on a small scale at Hayling, in the south of England, may be farther introduced into this country.

The lobster (*Astacus marinus* Fabr.*) belongs to the tribe of *Decapods*, and, according to La Blanchère, is easily recognized by its shell, which is of a brown, green, and blue shade, intermingled with red lines. The body terminates at the head with a tridented beak, with a double row of teeth on its upper jaw. It has two unequal-sized claws, one oval and powerful, the other more oblong, and small. The exterior antennæ are as long as the body, and are covered with red rings. The eyes are small and round, and of the same size as the peduncles. It has a large stomach and bent tail, terminated by five large swimming blades, serrated at the edges.

M. Coste, in his remarkable report to the minister of the French marine, has given the following description of the manner of the reproduction of the lobster, which will be found exceedingly interesting. "The lobster commences breeding in the month of October, and the pairing takes place sometimes as late as January. The couplings are rare at the opening of the season, but increase in frequency to the end of December, and but few take place in January. The female emits the eggs in about fifteen or twenty days after pairing. When they have reached the stage proper for their expulsion, the female applies the inner side of the tail against the plastrum, or shell immediately over the stomach, in such a manner as to form a cup or cavity, in which is to be found the openings of the oviducts placed exactly behind the third pair of legs. Consequently, when the eggs escape from the stomach, they fall into this natural cup or cavity as described above. They are expelled in successive jets to the number of 20,000 in a single day. The lobster, along with the eggs, emits at the same time a kind of adhesive liquid, which binds the egg one to the other, and attaches them all to the small feet under the tail, where they remain, in perfect shelter from all harm, until they are sufficiently ripe for final expulsion.

"In order to forward and force the regular incubation of the ova, the females have the power to give them more or less light, as they consider requisite, by closing or opening the folds of the tail. Sometimes the eggs are kept quite covered, and at other times they give them a kind of washing by moving the flanges of the tail in a peculiar manner. The incubation lasts six months, during which time the female takes such good care of the ova, that it is rare to find an injured embryo or barren egg. It is during the months of March, April, and May, that the actual birth of the young lobster takes place. When the females, in order to expel the em-

*Our species is the *Homarus Americanus*.

bryos, now ready to burst the shells of the eggs, extend their tails, make light oscillations with the fan and its appendages, so as to rid itself gradually of the young lobsters, which it succeeds in doing in a few days.

"The young lobster, as soon as born, swims away from its parent, rises to the surface of the water, and leaves the shores for the deep waters of the sea, where it passes the earliest days of its existence, in a vagabond state for a period of from thirty to forty days. During this time it undergoes four different changes of shell, but on the fourth, it loses its natatory organs, and is therefore no longer able to swim on the surface of the water, but falls to the bottom, where it has to remain for the future; according, however, to its increase of size, it gains courage to approach the shore, which it had left at its birth. The number of enemies which assail the young embryos in the deep sea is enormous, thousands of all kinds of fish, mollusks, and crustacea pursuing it continually to destroy it. The very changing of the shells causes great ravages at these periods, as the young lobsters have to undergo a crisis which appears to be a necessary condition to their rapid growth. In fact, every young lobster loses and remakes his crusty shell from eight to ten times the first year, five to seven the second, three to four the third, and from two to three the fourth year. However, after the fifth year, the change is only annual, for the reason that were the changes more frequent, the shell would not last long enough to protect the ova adhering to the shell of the female during the six months of incubation. The lobster increases rapidly in size until the second year, and goes on increasing more gradually until the fifth, when it begins to reproduce, and from this period the growth is still more gradual."—R. K. WOOD, in *Land and Water, London*.

GEOLOGY.

WHAT IS A GEODE?—The term *geode* is applied by geological writers to two distinct conditions and character of rocks, in so promiscuous a manner that the reader, without specimens, has no means by which to determine, with any degree of certainty, what it is of which the writer is treating. Let me illustrate by numbered examples:

No. 1. In many rocks there are irregular cavities, of moderate size, whose inner walls are studded with mineral crystals. The walls of these cavities are of the same material as the general mass of the rock in which they occur, and in no way distinguishable from it, the cavity being a mere opening in the general mass of the foundation.

No. 2. Rounded masses of quartz, often Chalcedonic, occurring enclosed in limestone, etc., but as foreign in character, from the mineral enclosing them, as raisins are to the mass of a pudding by which these have been surrounded in the process of cookery. When destructive weathering of the rock containing these takes place, these balls fall out into the soil, where they remain wholly unattacked by the elements.

These silicious nodules vary in size from that of an apple to that of